

## METHOD FOR CONFIGURING A COMMUNICATION CHANNEL

### FIELD OF THE INVENTION

[0001] The present invention relates to the field of cellular communication networks and in particular to cellular communication networks using time domain enhanced inter-cell interference coordination.

### BACKGROUND OF THE INVENTION

[0002] In the field of LTE, heterogeneous networks (HetNet) are used. A HetNet is composed by deploying small base stations in an existing macro-cell network. It can boost the system capacity and satisfy high user equipment (UE) traffic demand, but may cause severe interference to UEs. For instance, a macro-UE close to a Home eNB (HeNB) or a pico-UE close to a macro-eNB can hardly be served due to the heavy interference. Time Domain (TDM) enhanced Inter-Cell Interference-Coordination (eICIC) may be used to offer protection to these victim UEs. It may prevent some base stations from having data transmission in certain subframes, and hence may improve the channel condition of the victim UEs. These subframes are referred to as the Almost Blank Subframes (ABS), and the rest are normal subframes, known as non-ABS. A drawback of TDM eICIC is that the interference will change dramatically in time domain, depending on the muting pattern.

[0003] Further, Outer Loop Link Adaptation (OLLA) may be used in the base station for the link adaptation and packet scheduling process. It adjusts the Channel Quality Indicator (CQI) report based on information received by the UE. By doing so, OLLA may better align the CQI report with the actual channel condition, and may help control the Block Error Rate (BLER) for first transmissions even with imperfect CQI information.

[0004] According to 3GPP, UEs in a HetNet with TDM eICIC should be configured with separate CQI measurements for ABS and non-ABS. This guarantees the receiver side BLER performance, but is not supported by the legacy (i.e. old) UEs. The legacy UEs have to follow one CQI measurement pattern, and the estimated interference is averaged in time domain across a certain time window. Therefore, the interference variation due to TDM eICIC is not directly reflected in the CQI report of the legacy UEs. If the conventional OLLA is applied, a very high OLLA offset should be used to satisfy the BLER target. This prevents the legacy UEs from benefiting from TDM eICIC, and causes poorer spectral efficiency.

[0005] In view of the above-described situation, there exists a need for an improved technique that provides a cellular communication system substantially avoiding or at least reducing one or more of the above-identified problems. Hence, a system or method being able to provide efficient and improved configuration of a communication channel may be needed.

### SUMMARY OF THE INVENTION

[0006] This need may be met by the subject matter according to the independent claims. Advantageous embodiments of the herein disclosed subject matter are described by the dependent claims.

[0007] According to a first aspect of the herein disclosed subject matter, there is provided a method for configuring a

communication channel for a radio transmission within a cellular network between a user equipment and a base station. The communication channel is divided into subframes. The cellular network comprises a further base station, wherein the further base station is adapted to use a further communication channel. The further communication channel is divided into subframes, wherein a first part of the subframes of the communication channel is associated in time with a first part of the subframes of the further communication channel, which is unscheduled by the further base station due to a predefined muting pattern, and wherein a second part of the subframes of the communication channel is associated in time with a second part of the subframes of the further communication channel, which is scheduled by the further base station. The method comprises determining, by the base station, a first quality information being indicative for a quality of the first part of the subframes of the communication channel and a second quality information being indicative for a quality of the second part of the subframes of the communication channel, receiving, by the base station, a feedback information from the user equipment being indicative for the quality of the communication channel, determining a first compensation value based on the first quality information and the feedback information, wherein the compensation value is adapted for compensating a difference between the first quality information and the feedback information, and a second compensation value based on the second quality information and the feedback information, wherein the compensation value is adapted for compensating a difference between the second quality information and the feedback information, adjusting the feedback information based on the determined first compensation value and based on the determined second compensation value, and configuring the communication channel based on the adjusted feedback information.

[0008] This aspect may relate in particular to the field of heterogeneous networks (HetNet) and Outer Loop Link Adaptation (OLLA). As described above, UEs in a HetNet with TDM eICIC should be configured with separate CQI measurements for ABS and non-ABS. This guarantees the receiver side BLER performance, but is not supported by the legacy (i.e. old) UEs. The legacy UEs have to follow one CQI measurement pattern, and the estimated interference is averaged in time domain across a certain time window. Therefore, the interference variation due to TDM eICIC is not directly reflected in the CQI report of the legacy UEs. If the conventional OLLA is applied, a very high OLLA offset should be used to satisfy the BLER target. This prevents the legacy UEs from benefiting from TDM eICIC, and causes at the same time poorer spectral efficiency.

[0009] Hence, the basic idea of the present invention is to provide a method being able to provide a method being able to modify the basic OLLA configuration to satisfy the BLER target and maintain high spectral efficiency. It may especially apply for UEs who cannot measure the CQI for ABS/non-ABS separately. According to the described method, in a HetNet scenario with TDM eICIC, the base station may use two separate OLLAs (dual-OLLA) for each legacy UE, one for ABS and one for non-ABS.

[0010] The terms “muted subframes” and “un-muted subframes” in this context may refer to ABS and non-ABS subframes as described above. During ABS, there is no or less reduced interference from a neighbor base station (in this case the further base station) as this base station does not schedule